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EXAMINER	
MCDERMOTT, KEVIN	

ART UNIT	PAPER NUMBER
3635	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/044,660	BROWN, PAUL
	Examiner	Art Unit
	Kevin McDermott	3635

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20,22,24-27,29-37,40 and 42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20,22,24-27,29-37,40 and 42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

The June 4, 2003 Office Action indicated that claims 21, 37, 38, 39, and 40 contained allowable subject matter. With his November 6, 2003 amendment, Applicant incorporated the subject matter of claims 21 and 38 into claims 1 and 29, respectively, to allow the case. However, upon further consideration, Examiner hereby withdraws the allowability of the subject matter of previous claims 21, 38, and 39, and current claims 37 and 40. The claims are rejected as indicated below.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Independent claims 1 and 29, and all claims depending therefrom, are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1 and 29 have been amended to include the subject matter of claims 21 and 38, respectively. However, Applicant has also amended claims 1 and 29 such that "when R_2 is Al_2 then Me(II) is not Ca". This limitation appears to be new matter. The specification does not discuss this and it does not appear in the drawings.

The previous Office Action rejected claims 24 and 25 under 35 USC sec. 112 – second paragraph. Each of these claims has been amended to improve their clarity.

Regarding claim 24, Examiner suggests amending the claim to read:

"The method of claim 1, wherein the metals are embedded reinforcing elements."

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 6, 7, 10-14, 16-19, 22, and 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenberg (U.S. Patent No. 4,285,733) in view of Johnston (U.S. Patent No. 5,071,579) and Allen and further in view of Tatematsu.

Regarding claims 1, 16, and 18, Rosenberg discloses in column 1, lines 9-45 a corrosion inhibiting concrete composition comprising a high strength concrete formed from a hydraulic cement and which contains at least about 2% calcium nitrate therein. Calcium nitrite is a low solubility compound.

Additionally, Rosenberg discloses concretes formed from hydraulic cements are used as structural components in various applications, such as in the formation of roads, bridge deckings, building structures, multistory automobile storage structures and the like. In order to enhance the properties of the concrete to permit its utilization in these manners, the material normally is used in combination with iron or steel reinforcing. The reinforcing is usually in the form of metal rods or bars and is subjected

to attack by the various corrosive elements contained in the concrete, as well as by the application of external corrosive elements to the structure, such as chloride salts and the like, which are commonly used in the removal of ice and snow from roads, bridges, pedestrian walkways, and the like. To counteract these corrosive effects, various corrosion inhibiting agents have been proposed for use as admixtures.

Column 4, lines 24-36 disclose combining calcium nitrite with concrete to form a composition which substantially eliminates corrosion to metal pieces contained therein over a sustained period of time and, thus, permits extended life and elimination of repair to concrete formations formed from such compositions.

Column 4, lines 37-50 disclose adding the calcium nitrite to the concrete by various methods. It can be added to cement clinker prior to grinding and can be thoroughly mixed with the cement component during the grinding step. The calcium nitrite can also be added to the dry concrete mixture and can be thoroughly mixed to uniformly disperse it therein. The calcium nitrite can be dissolved in the water which is used to form the concrete composition. The concrete mixture can be premixed with water and then mixed or contacted with the calcium nitrite. In general, any method of mixing can be used which permits the substantial uniform mixing of the calcium nitrite with the concrete mix prior to its forming a hardened composition.

However, Rosenberg does not disclose attaching the calcium nitrite to a concrete structure or substituting $[3Me(II)O.R_2O_3.Me(II)(anion)_2.nH_2O]$, where n=0 to 24 or $[3Me(II)O.R_2O_3.Me(II)(anion).nH_2O]$, where n=0 to 18, wherein Me(II) is one or more cations selected from the group consisting of Ca, Ba, Sr, Mn and Zn, R_2 is Al_2, Cr_2 or

Fe_2, the anion is NO_2, NO_3, CO_3, BO_4, or OH, but when R_2 is Al_2 then Me(II) is not Ca – for the calcium nitrite.

Johnston relates to products and methods of inhibiting corrosion caused by chloride ions and the like, such a corrosion caused by deicers, acid rains, and the like. Claims 1 discloses a method of inhibiting corrosion caused by chloride ions, in reinforced concrete containing rebars, comprising laying on the surface of a reinforced concrete containing rebars, a corrosion inhibiting system containing at least sodium flourophosphate, and wherein in contact with water the sodium flourophosphate inhibits the corrosion of the rebar.

Allen discloses in figure 7B and in column 15, lines 42 to 65, refurbishing existing deck panels having a bottom portion 54 and an upper layer 56. The upper layer 56 is removed and it is assumed that the upper layer 56 was chloride contaminated and the upper mat 30 of flexural reinforcing material was corroded and causing cracking, spalling and delamination of bridge deck panel 12. After removing layer 56 a continuous cast-in-place concrete topping 57 is then placed over remaining layer 54.

Tatematsu discloses in column 1, line 7 to column 7, line 3, cement additives for inhibiting concrete-deterioration and for inhibiting the corrosion of reinforcing steel caused by chloride ions contained in the concrete. Specifically, Tatematsu discloses using hydrocalumite [$3CaO.Al_2O_3.Ca(NO_2)_2.11H_2O$] to take in Cl^-.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to create an overlay containing at least one compound capable of sequestering chloride ions and securing the overlay to a concrete structure

and then sequestering chloride ions in the overlay. Additionally, it would have been an obvious matter of design choice to substitute hydrocalumite as disclosed by Tatematsu for the calcium nitrite of Rosenberg, since applicant has not disclosed that using a corrosion inhibitor wherein Me(II) is one or more cations selected from the group consisting of Ca, Ba, Sr, Mn and Zn, R_2 is Al_2, Cr_2 or Fe_2, the anion is NO_2, NO_3, CO_3, BO_4, or OH, but when R_2 is Al_2 then Me(II) is not Ca, solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well using Ca and Al_2.

One of ordinary skill would be motivated to make such a modification to inhibit rebar corrosion caused by chloride ions.

Regarding claim 2, after disposing the concrete of Rosenberg on the concrete layer 54 of Allen, chloride exchange would automatically occur between the concrete layers.

Regarding claim 3, as discussed above, the concrete overlay of Allen is cast-in-place.

Regarding claim 6, the bottom portion 54 of Allen is secured to the concrete topping 57 to establish surface-to-surface contact between the bottom portion 54 and layer 57.

Regarding claim 7, liquid concrete is a slurry. Websters collegiate dictionary – tenth edition defines slurry as a watery mixture of insoluble matter.

Regarding claim 10, the material of Rosenberg is concrete.

Regarding claim 11, a concrete slurry contains water. Water is a high ionic strength liquid.

Regarding claim 12, bridge structures have many components, such as the concrete deck and the piers supporting the deck. The piers are partially submerged in water when the bridge is over a body of water.

Regarding claim 13, Allen discloses the process without using electrical energy.

Regarding claims 14 and 22, Allen discloses in column 12, lines 52-62, the panels being eight inches thick, so that the top and bottom portions are each 4 inches thick. The cast-in-place layer 57 is approximately 4 inches.

Regarding claim 17, Rosenberg's material contains nitrite.

Regarding claim 18, as discussed above, metal reinforcing rods or bars are located within the concrete mix. The reinforcing is the claimed metal elements.

Regarding claim 19, calcium nitrite is capable of liberating nitrite ions.

Regarding claim 24, the reinforcing bars of Allen are embedded in concrete.

Regarding claim 25, as discussed above regarding Rosenberg, the calcium nitrite may be introduced into the concrete at any point.

Regarding claim 26, as discussed above, the calcium nitrite can be thoroughly mixed in dry form with cement in dry form.

Regarding claim 27, Portland cement includes aggregates. These aggregates qualify as other ingredients added before the water.

Claims 29, 30, 32, 33, 35-37, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allen in view of Rosenberg (U.S. Patent No. 4,285,733) and Johnston (U.S. Patent No. 5,071,579) and further in view of Tatematsu.

Allen discloses in figure 7B and in column 15, lines 42 to 65, refurbishing existing concrete bridge deck panels having a bottom portion 54 and an upper layer 56. Bridges are parts of highways that cross geographic impediments such as rivers and canyons. Bottom portion 54 contains reinforcing bars 20. The upper layer 56 is removed and it is assumed that the upper layer 56 was chloride contaminated and the upper mat 30 of flexural reinforcing material was corroded and causing cracking, spalling and delamination of bridge deck panel 12. After removing layer 56 a continuous cast-in-place concrete topping 57 is then placed over remaining layer 54.

However, Allen does not disclose the cast-in-place layer 57 containing a compound capable of sequestering chloride ions, using the cast-in-place layer system in a parking garage, and making the concrete corrosion inhibitor/compound from $[3Me(II)O.R_2O_3.Me(II)(anion)_2.nH_2O]$, where n=0 to 24, or $[3Me(II)O.R_2O_3.Me(II)(anion).nH_2O]$, where n=0 to 18, wherein Me(II) is one or more cations selected from the group consisting of Ca, Ba, Sr, Mn and Zn, R_2 is Al_2, Cr_2 or Fe_2, the anion is NO_2, NO_3, CO_3, BO_4, or OH, but when R_2 is Al_2 then Me(II) is not Ca.

Rosenberg discloses in column 1, lines 9-45 a corrosion inhibiting concrete composition comprising a high strength concrete formed from a hydraulic cement and which contains at least about 2% calcium nitrate therein. Calcium nitrite is a low solubility compound.

Additionally, Rosenberg discloses concretes formed from hydraulic cements are used as structural components in various applications, such as in the formation of roads, bridge deckings, building structures, multistory automobile storage structures and the like. In order to enhance the properties of the concrete to permit its utilization in these manners, the material normally is used in combination with iron or steel reinforcing. The reinforcing is usually in the form of metal rods or bars and is subjected to attack by the various corrosive elements contained in the concrete, as well as by the application of external corrosive elements to the structure, such as chloride salts and the like, which are commonly used in the removal of ice and snow from roads, bridges, pedestrian walkways, and the like. To counteract these corrosive effects, various corrosion inhibiting agents have been proposed for use as admixtures.

Column 4, lines 24-36 disclose combining calcium nitrite with concrete to form a composition which substantially eliminates corrosion to metal pieces contained therein over a sustained period of time and, thus, permits extended life and elimination of repair to concrete formations formed from such compositions.

Column 4, lines 37-50 disclose adding the calcium nitrite to the concrete by various methods. It can be added to cement clinker prior to grinding and can be thoroughly mixed with the cement component during the grinding step. The calcium nitrite can also be added to the dry concrete mixture and can be thoroughly mixed to uniformly disperse it therein. The calcium nitrite can be dissolved in the water which is used to form the concrete composition. The concrete mixture can be premixed with water and then mixed or contacted with the calcium nitrite. In general, any method of

mixing can be used which permits the substantial uniform mixing of the calcium nitrite with the concrete mix prior to its forming a hardened composition.

Johnston relates to products and methods of inhibiting corrosion caused by chloride ions and the like, such a corrosion caused by deicers, acid rains, and the like. Claims 1 discloses a method of inhibiting corrosion caused by chloride ions, in reinforced concrete containing rebars, comprising laying on the surface of a reinforced concrete containing rebars, a corrosion inhibiting system containing at least sodium flourophosphate, and wherein in contact with water the sodium flourophosphate inhibits the corrosion of the rebar.

After disposing the concrete of Rosenberg on the concrete layer 54 of Allen, chloride exchange would automatically occur between the concrete layers.

Tatematsu discloses in column 1, line 7 to column 7, line 3, cement additives for inhibiting concrete-deterioration and for inhibiting the corrosion of reinforcing steel caused by chloride ions contained in the concrete. Specifically, Tatematsu discloses using hydrocalumite [$3CaO.Al_2O_3.Ca(NO_2)_2.11H_2O$] to take in Cl^-.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to create an overlay containing at least one compound capable of sequestering chloride ions and use it in the system of Allen on a garage structure.

Additionally, it would have been an obvious matter of design choice to use hydrocalumite as disclosed by Tatematsu as the sequestering compound, since applicant has not disclosed that using a corrosion inhibitor wherein Me(II) is one or more

cations selected from the group consisting of Ca, Ba, Sr, Mn and Zn, R_2 is Al_2, Cr_2 or Fe_2, the anion is NO_2, NO_3, CO_3, BO_4, or OH, but when R_2 is Al_2 then Me(II) is not Ca solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well using Ca and Al_2.

Furthermore, regarding claims 37 and 40, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute Fe_2 for Al_2, since the Examiner takes the position that Fe_2 and Al_2 are equivalent for their use in the concrete art and the selection of any of these known equivalents to inhibit rebar corrosion would be within the level of ordinary skill in the art.

One of ordinary skill would be motivated to make such a modification to inhibit rebar corrosion caused by chloride ions in any type of reinforced concrete structure.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenberg (U.S. Patent No. 4,285,733) in view of Johnston (U.S. Patent No. 5,071,579), Allen, and Tatematsu, and further in view of Rosenberg (U.S. Patent No. 4,092,109).

The disclosures of Rosenberg (U.S. Patent No. 4,285,733), Johnston (U.S. Patent No. 5,071,579), Allen and Tatematsu are discussed above.

However, none of these references disclose the compound added to the concrete being capable of establishing a corrosion resistant layer on metal parts embedded in the concrete.

Rosenberg (U.S. Patent No. 4,092,109) discloses in column 2, lines 23-28, mixing calcium nitrite with concrete so that calcium ions can form a carbonate, which eventually forms a cathodic protection coating on the metal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to create an overlay containing at least one compound capable of establishing a corrosion resistant payer on metal parts embedded in concrete.

One of ordinary skill would be motivated to make such a modification to inhibit rebar corrosion caused by chloride ions in any type of reinforced concrete structure.

Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Allen in view of Rosenberg (U.S. Patent No. 4,285,733), Johnston (U.S. Patent No. 5,071,579), and Tatematsu, and further in view of Rosenberg (U.S. Patent No. 4,092,109).

The disclosures of Allen, Rosenberg (U.S. Patent No. 4,285,733), Johnston (U.S. Patent No. 5,071,579), and Tatematsu are discussed above.

However, none of these references disclose the compound added to the concrete being capable of establishing a corrosion resistant layer on metal parts embedded in the concrete.

Rosenberg (U.S. Patent No. 4,092,109) discloses in column 2, lines 23-28, mixing calcium nitrite with concrete so that calcium ions can form a carbonate, which eventually forms a cathodic protection coating on the metal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to create an overlay containing at least one compound capable of establishing a corrosion resistant layer on metal parts embedded in concrete.

One of ordinary skill would be motivated to make such a modification to inhibit rebar corrosion caused by chloride ions in any type of reinforced concrete structure.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenberg (U.S. Patent No. 4,285,733) in view of Johnston (U.S. Patent No. 5,071,579) and Allen, and further in view of Tatematsu.

The disclosures of these references are discussed above. However, neither of these references discloses applying the concrete overlay as two separate concrete pours.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the overlay using two layers made from two separate concrete pours, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

One of ordinary skill would be motivated to make such a modification to inhibit rebar corrosion caused by chloride ions in any type of reinforced concrete structure.

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Allen in view of Rosenberg (U.S. Patent No. 4,285,733) and Johnston (U.S. Patent No. 5,071,579) and further in view of Tatematsu.

However, neither reference specifically discloses using the calcium nitrite on a pier.

Rosenberg (U.S. Patent No. 4,285,733) discloses the calcium nitrite system being used in several types of reinforced concrete construction.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the overlay method of Allen using the calcium nitrite concrete mixture of Rosenberg.

One of ordinary skill would be motivated to make such a modification to inhibit rebar corrosion caused by chloride ions in any type of reinforced concrete structure.

Allowable Subject Matter

Claims 4, 5, 9, 20, and 42 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 4 and 5, the prior art does not disclose, and it does not appear obvious to modify the prior art to disclose, the method recited in claims 1 and 2, wherein the overlay is pre-cast and then secured to the concrete structure so that ions can be exchanged.

Regarding claim 9, the prior art does not disclose, and it does not appear obvious to modify the prior art to disclose, the method recited in claims 1, 7, and 8 wherein the second concrete layer has a lower porosity than the first concrete layer.

Regarding claim 20, the prior art does not disclose, and it does not appear obvious to modify the prior art to disclose, the method recited in claim 1, wherein the compound is selected from the group of claim 20.

Regarding claim 42, the prior art does not disclose, and it does not appear obvious to modify the prior art to disclose, the method recited in claim 1, wherein the compound is employed in the reaction recited in claim 42.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Kevin McDermott, whose telephone number is 703-308-8266.

Carl D. Friedman
Supervisory Patent Examiner
Group 3600

1/27/04